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EXAMINER	
SHINGLES, KRISTIE D	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/575,632	LANDIS ET AL.	
	Examiner	Art Unit	
	KRISTIE D. SHINGLES	2444	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 April 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-86* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-30,33-72 and 75-86* is/are rejected.

7)☒ Claim(s) *31,32,73 and 74* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *4/2006,5/2008*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claims 1-86 are pending.

Information Disclosure Statement

I. The information disclosure statements (IDS) submitted on 5/8/2008 and 4/7/2006 are in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner. Initialed and dated copies of Applicant's IDS 1449 forms are attached to the instant Office action.

Non-Statutory Double Patenting

II. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

III. Claims 1-4, 6, 48-51 and 53 are provisionally rejected on the ground of nonstatutory double patenting over Claims 1, 2 and 15-16 of copending Application No. 10/575,140 (US Publication 2007/0067435). This is a provisional double patenting rejection since the conflicting claims have not yet been patented.

Table A.

Instant Application – 10/575,632	Co-pending Application – 10/575,140
1 and 48. A **virtualization system for a host computer having at least one host processor and system resources including memory divided into most privileged system memory and less privileged user memory,** the system comprising: **virtualization software that operates in said less privileged user memory and divides said host computer into a plurality of virtual partitions including at least one user guest partition and at least one system partition, said at least one user guest partition providing a virtualization environment for at least one guest operating system, and said at least one system partition maintaining a resource database for use in managing use of said at least one host processor and said system resources;** **at least one monitor that operates in said most privileged system memory and maintains guest applications in said at least one guest partition within memory space allocated by said at least one system partition to said at least one guest partition**; and **a context switch between said at least one monitor and said respective guest and system partitions for controlling multitask processing of software in said partitions on said at least one host processor.**	1 and 15. A **virtual data center implemented on hardware resources of at least one host computer having at least one host processor and system resources including memory divided into most privileged system memory and less privileged user memory**, the virtual data center comprising: virtualization software loaded on each host computer, said **virtualization software operating in said less privileged user memory and dividing the host computer into a plurality of virtual partitions including at least one user guest partition and at least one system partition, said at least one user guest partition providing a virtualization environment for at least one guest operating system, and said at least one system partition maintaining a resource database for use in managing use of said at least one host processor and said system resources;** **at least one monitor that operates in said most privileged system memory and maintains guest applications in said at least one guest partition within memory space allocated by said at least one system partition to said at least one guest partition;** **a context switch between said at least one monitor and said respective guest and system partitions for controlling multitask processing of software in said partitions on said at least one host processor**; and a software application that owns a configuration policy for said data center and tracks persistence for respective domains to which each partition of said at least one host computer is assigned by said at least one system partition.
2 and 49. The virtualization system of claim 1, **wherein said at least one system partition includes a resource management software application that assigns system resources to respective system and guest partitions and provides an index to the assigned system resource in said resource database.** 3 and 50. The virtualization system of claim 2, wherein requested changes in the assignment of said system resources by said resource management software are	2 and 16. The virtual data center of claim 1, **wherein said at least one system partition comprises** an ultravisor partition that **includes said resource database and a resource management software application that assigns system resources to respective system and guest partitions and provides an index to the assigned system resource in said resource database**, a command partition that owns a **resource allocation policy for the host system on which it is loaded and that creates transactions that**

communicated to said resource management software as transactions that are processed by said resource management software to update said resource database. 4 and 51. The virtualization system of claim 3, wherein said **resource management software allocates shared memory to respective partitions as memory channels through which said transactions may pass from one partition to another**.	**pass through a command memory channel**
6 and 53. The method of claim 52, wherein said **at least one system partition comprises an ultravisor partition that includes said resource database and said resource management software application and a command partition that includes resource allocation software that owns a resource allocation policy for said host system and that creates transactions for updating said resource database, comprising the further step of providing a command memory channel between said command partition and said ultravisor partition and passing said transaction through said command memory channel to said resource management software application for reallocation of said system resources as specified in said transaction**.	**between said command partition and said ultravisor partition for processing by said resource management software for reallocation of said system resources as specified in said transaction.**

IV. <u>Claims 1 and 15</u> are provisionally rejected on the ground of nonstatutory double patenting over Claims 1 and 9 of copending Application No. 10/575,071 (US Publication 2007/0061441). This is a provisional double patenting rejection since the conflicting claims have not yet been patented.

Table A.

Instant Application – 10/575,632	Co-pending Application – 10/575,071
1 and 48. A **virtualization system for a host computer having at least one host processor and system resources including memory divided into most privileged system memory and less privileged user memory,** the system comprising: **virtualization software that operates in said less privileged user memory and divides said host computer into a plurality of virtual partitions including at least one user guest partition and at least one system partition, said at least one user guest partition providing a virtualization environment for at least one guest operating system, and said at least one system partition maintaining a resource database**	1 and 9. A virtualization system for a host computer having **at least one host processor and system resources including physical I/O hardware and memory divided into most privileged system memory and less privileged user memory**, the system comprising: virtualization software that operates in said less **privileged user memory and divides said host computer into a plurality of virtual partitions including at least one user guest partition that provides a virtualization environment for at least one guest operating system**;

for use in managing use of said at least one host processor and said system resources; **at least one monitor that operates in said most privileged system memory and maintains guest applications in said at least one guest partition within memory space allocated by said at least one system partition to said at least one guest partition**; and **a context switch between said at least one monitor and said respective guest and system partitions for controlling multitask processing of software in said partitions on said at least one host processor.**	**at least one monitor that operates in said most privileged system memory and maintains guest applications in said at least one guest partition within memory space specified in said resource database**; and **a context switch between said at least one monitor and said respective guest and I/O partitions for controlling multitask processing of software in said partitions on said at least one host processo**r.
2 and 49. The virtualization system of claim 1, wherein said at least one system partition includes a resource management software application that assigns system resources to respective system and guest partitions and provides an index to the assigned system resource in said resource database.	
16 and 62. The virtualization system of claim 2, wherein said system resources include memory channels that enable the communication of transactions among respective guest and system partitions of said host computer, said memory channels comprising shared memory allocated to respective partitions.	
17 and 63. The virtualization system of claim 16, wherein said **at least one system partition includes at least one input/output (I/O) partition that maps physical I/O hardware of said host computer to endpoints of an I/O channel server in said I/O partition, said I/O channel server sharing the physical I/O hardware with at least one guest partition or another system partition via a memory channel between said I/O partition and said at least one guest partition or system partition, said resource management software allocating shared memory to said at least one guest partition or system partition and to said I/O partition to form said memory channel.**	**at least one input/output (I/O) partition that maps said physical I/O hardware to endpoints of an I/O channel server in said at least one I/O partition, said I/O channel server sharing the physical I/O hardware with at least one guest partition via a memory channel comprising memory shared between said at least one I/O partition and said at least one guest partition; a resource database for use in managing use of said at least one host processor and said system resources**
18 and 64. The virtualization system of claim 17, wherein **upon receipt of a request to said I/O channel server from said at least one guest partition or system partition to access physical I/O hardware said I/O partition checks with partition descriptors stored in a monitor associated with said at least one guest partition or system partition to verify that the requested physical I/O hardware access is valid.**	2 and 10. The virtualization system of claim 1, wherein **upon receipt of a request to said I/O channel server from said at least one guest partition to access physical I/O hardware said I/O partition checks with partition descriptors stored in a monitor associated with said at least one guest partition to verify that the requested physical I/O hardware access is valid.**
19 and 65. The virtualization system of claim 17, wherein **said mapping by said at least one I/O partition of said physical I/O hardware of said host computer to endpoints of said I/O channel server in**	3 and 11. The virtualization system of claim 1, wherein **said mapping by said at least one I/O partition of said physical I/O hardware of said host computer to endpoints of said I/O channel server in said I/O**

said I/O partition is performed by I/O partition software that multiplexes through shared common I/O physical hardware any I/O requests to said common I/O physical hardware from multiple partitions connected to said I/O partition by respective memory channels.	**partition is performed by I/O partition software that multiplexes through shared common I/O physical hardware any I/O requests to said common I/O physical hardware from multiple partitions connected to said I/O partition by respective memory channels.**
20 and 66. The virtualization system of claim 19, wherein **an I/O monitor associated with said I/O partition implements a system call interface between said I/O monitor and said I/O partition, said system call interface converting and validating client partition relative addresses, obtained as buffer parameters of requests sent through respective memory channels from client memory channel drivers, as valid hardware physical addresses of memory currently assigned to the client partition requesting access to said common I/O physical hardware.**	4 and 12. The virtualization system of claim 3, wherein **an I/O monitor associated with said I/O partition implements a system call interface between said I/O monitor and said I/O partition, said system call interface converting and validating client partition relative addresses, obtained as buffer parameters of requests sent through respective memory channels from client memory channel drivers, as valid hardware physical addresses of memory currently assigned to the client partition requesting access to said common I/O physical hardware.**
21 and 67. The virtualization system of claim 20, wherein **messages between a server of said I/O partition and said respective client partitions are queued by the client partitions and de-queued by the I/O partition server and the partition relative physical addresses are converted by the I/O partition server to physical I/O hardware addresses with the aid of the I/O monitor, whereby data may be exchanged with hardware I/O adapters connected between said I/O monitor and said common I/O physical hardware.**	5 and 13. The virtualization system of claim 4, wherein **messages between a server of said I/O partition and said respective guest partitions are queued by the guest partitions and de-queued by the I/O partition server and the partition relative physical addresses are converted by the I/O partition server to physical I/O hardware addresses with the aid of the I/O monitor, whereby data may be exchanged with hardware I/O adapters connected between said I/O monitor and said common I/O physical hardware.**
22 and 68. The virtualization system of claim 17, wherein **said mapping by said at least one I/O partition of said physical I/O hardware of said host computer to endpoints of said I/O channel server in said I/O partition is performed by passing I/O setup information via said memory channel to said I/O channel server so as to set up a high performance memory channel between a client partition requesting I/O access and intelligent physical I/O hardware and sending data directly between said client partition requesting I/O access and said intelligent physical I/O hardware via said high performance memory channel.**	6 and 14. The virtualization system of claim 1, wherein **said mapping by said at least one I/O partition of said physical I/O hardware of said host computer to endpoints of said I/O channel server in said I/O partition is performed by passing I/O setup information via said memory channel to said I/O channel server so as to set up a high performance memory channel between a client partition requesting I/O access and intelligent physical I/O hardware and sending data directly between said client partition requesting I/O access and said intelligent physical I/O hardware via said high performance memory channel.**
23 and 69. The virtualization system of claim 22, **wherein the client partition requesting I/O access transfers data via said I/O memory channel to said intelligent physical I/O hardware using one of a user mode I/O or direct memory access data transfer operation.**	7 and 15. The virtualization system of claim 6, **wherein the guest partition requesting I/O access transfers data via said I/O memory channel to said intelligent physical I/O hardware using one of a user mode I/O or direct memory access data transfer operation.**
24. The virtualization system of claim 17, **wherein the at least one I/O partition includes two redundant I/O partitions.**	8. The virtualization system of claim 1, **wherein the at least one I/O partition includes two redundant I/O partitions.**

Specification

V. The disclosure is objected to because it contains embedded hyperlinks and/or other forms of browser-executable code (see pages 7, 8 and 42). Applicant is required to delete the embedded hyperlinks and/or other forms of browser-executable code. See MPEP § 608.01.

Claim Rejections - 35 USC § 102

VI. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless --
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

VII. Claims 1-3, 10-11, 25-30, 33, 48-50, 57-58, 70-72 and 75 are rejected under 35 U.S.C. 102(e) as being anticipated by *Kjos et al et al* (US 2004/0064668).

a. **Per claim 1,** *Kjos et al* teach a virtualization system for a host computer having at least one host processor and system resources including memory divided into most privileged system memory and less privileged user memory, the system comprising:

- virtualization software that operates in said less privileged user memory and divides said host computer into a plurality of virtual partitions including at least one user guest partition and at least one system partition, said at least one user guest partition providing a virtualization environment for at least one guest operating system, and said at least one system partition maintaining a resource database for use in managing use of said at least one host processor and said system resources (*page 1 paragraphs 0006, page 3 paragraph 0038—virtual memory machine and system with guest operating system partition with less privilege levels and monitor with most privilege level*);

- at least one monitor that operates in said most privileged system memory and maintains guest applications in said at least one guest partition within memory space allocated by said at least one system partition to said at least one guest partition (*page 1 paragraphs 0006—guest operating system partition with less privilege levels and monitor with most privilege level*); and

- a context switch between said at least one monitor and said respective guest and system partitions for controlling multitask processing of software in said partitions on said at least one host processor (*page 1 paragraphs 0038-0039, 0056, 0063 and 0072—context switching between monitoring operating system and guest operating system partitions*).

b. **Claim 48** differs from Claim 1 merely by statutory class but contains limitations that are equivalent to the limitations of Claim 1 therefore it is rejected under the same basis.

c. **Per claim 2,** *Kjos et al* teach the virtualization system of claim 1, wherein said at least one system partition includes a resource management software application that assigns system resources to respective system and guest partitions and provides an index to the assigned system resource in said resource database (*page 3 pages 0038-0039, page 5 paragraph 0050, page 7 paragraphs 0063-0064, page 9 paragraphs 0072-0073, page 12 paragraph 0085—monitor operating system partition manages resources with a pointer that references the guest operating system resources in the data structure).*

d. **Claim 49** claims subject matter that is substantially equivalent to the limitations of claim 2 and is therefore rejected under the same basis.

e. **Per claim 3,** *Kjos et al* teach virtualization system of claim 2, wherein requested changes in the assignment of said system resources by said resource management software are communicated to said resource management software as transactions that are processed by said resource management software to update said resource database (*page 8 paragraph 0069, page 9 paragraphs 0072-0073—updating the data structure with changes in resource allocation*).

f. **Claim 50** claims subject matter that is substantially equivalent to the limitations of claim 3 and is therefore rejected under the same basis.

g. **Per claim 10,** *Kjos et al* teach the virtualization system of claim 1, wherein said at least one monitor includes a lead monitor associated with a system partition containing said resource database and said lead monitor limits itself to read only access to partition descriptors stored in said resource database (*page 9 paragraph 0072, page 10 paragraphs 0075-0076, page 12 paragraph 0085—monitor maintains monitor VHPT for providing context information and addresses from the data structure of guest operating systems*).

h. **Claim 57** claims subject matter that is substantially equivalent to the limitations of claim 10 and is therefore rejected under the same basis

i. **Per claim 11,** *Kjos et al* teach the virtualization system of claim 10, wherein said at least one monitor includes a monitor associated with a guest partition, and said lead monitor is configured to read partition descriptors for said guest partition from said resource database and to provide said partition descriptors to said monitor, whereby said monitor may use said partition descriptors to constrain guest applications within said guest partition (*page 8 paragraphs 0068-0071—monitor process partition data to constrain guest partition applications and programs*).

j. **Claim 58** claims subject matter that is substantially equivalent to the limitations of claim 11 and is therefore rejected under the same basis.

k. **Per claim 25,** *Kjos et al* teach the virtualization system of claim 2, wherein said system resources include input/output (I/O) hardware resources of said host computer (*Figures 16-17B and 23, 7:0067—memory mapped I/O spaces from host to guest partition*).

l. **Per claim 26,** *Kjos et al* teach the virtualization system of claim 2, wherein said system resources include whole or fractional parts of the processing of each host processor of said host computer (*page 3 paragraphs 0038 and 0042*).

m. **Per claim 27,** *Kjos et al* teach the virtualization system of claim 26, wherein the resource management software application allocates processing cycles of said at least one host processor by limiting privilege levels of virtual processors so as to allow control of said at least one host processor through control of an Interrupt Descriptor Table (IDT) by said resource management software application (*page 3 paragraph 0043, page 5 paragraph 0054, page 7 paragraph 0065—system registers for allocating memory and limiting privilege levels of virtual processors and interruption processor status register with interrupt vector tables*).

n. **Claim 70** claims subject matter that is substantially equivalent to the limitations of claim 27 and is therefore rejected under the same basis.

o. **Per claim 28,** *Kjos et al* teach the virtualization system of claim 27, wherein the resource management software application accesses the IDT to provide a timer interrupt to the at least one host processor, wherein said timer interrupt is used by said context switch to initiate virtual processor context switches (*page 7 paragraph 0063, page 9 paragraph 0072*).

p. **Claim 71** claims subject matter that is substantially equivalent to the limitations of claim 28 and is therefore rejected under the same basis.

q. **Per claim 29,** *Kjos et al* teach the virtualization system of claim 2, wherein said system resources include physical memory of said host computer (*page 3 paragraphs 0038 and 0042*).

r. **Per claim 30,** *Kjos et al* teach the virtualization system of claim 29, wherein a memory allocation page map of said resource database is organized according to a tiered page size model including a hierarchy of scales using 2^x as a scaling factor whereby an index page at each tiered page size level may allocate 2^x memory blocks at a size of the next lower tiered page size level (*page 6 paragraphs 0056-0059, page 7 paragraph 0062, page 8 paragraphs 0068-0069—memory page allocation in tiered size level using 2^x as a scaling factor*).

s. **Claim 72** claims subject matter that is substantially equivalent to the limitations of claim 30 and is therefore rejected under the same basis.

t. **Per claim 33,** *Kjos et al* teach the virtualization system of claim 30, wherein x=10 and wherein a virtual partition number is represented in said memory allocation page map as a 32 bit index (2, 10, 10, 10) into a map of 4k pages that identifies the virtual partition descriptor for the virtual partition with said virtual partition number, where a first bit indicates suballocation in smaller pages and three successive 2.sup.10 values identify scaled pages (*page 8 paragraphs 0068-0070, page 9 paragraph 0073*).

u. **Claim 75** claims subject matter that is substantially equivalent to the limitations of claim 33 and is therefore rejected under the same basis.

Claim Rejections - 35 USC § 103

VIII. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

IX. Claims 12-15, 34-37, 39-40, 56, 59-61, 76-78 and 80-81 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Kjos et al* (US 2004/0064668) in view of *Uchishiba et al* (2002/0016812).

v. **Per claim 12,** *Kjos et al* teach the virtualization system of claim 11 as applied above, yet fail to further teach wherein said monitor does not control access to any system resources. However *Uchishiba et al* teach monitoring the amount resources assigned to the partitions (*Abstract, Figure 1*). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of *Kjos et al* and *Uchishiba et al* for the purpose of providing separate monitors that have different duties, wherein the monitor for the guest resources monitors the resources that are assigned to the partitions but does not control access to the system's resources; because doing so allows for distribution and hierarchy of monitoring tasks in system.

w. **Per claim 13,** *Kjos et al* teach the virtualization system of claim 11, yet fail to further teach, wherein said at least one monitor includes a different monitor instance associated with each different guest partition, each said monitor being customized to a guest operating system in its corresponding guest partition so as to prevent said guest operating system from obtaining resources that have not been allocated to said guest partition by partition descriptors for said guest operating system in said resource database. However *Uchishiba et al* teach a monitor for each guest partition to monitor, assign and allocate the proper resources to each guest partition (*Abstract, Figure 1, pages 1-2 paragraphs 0014-0017, page 3 paragraph 0045*). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of *Kjos et al* and *Uchishiba et al* for the purpose of providing separate

monitors for each of the guest partitions, to provide a more effective system such that each monitor is able to exclusively monitor and devote its duties to focusing on one particular partition and in maintaining that specific partition's information and status.

x. **Claim 59** claims subject matter that is substantially equivalent to the limitations of claim 13 and is therefore rejected under the same basis.

y. **Per claim 14,** *Kjos et al* in view of *Uchishiba et al* teach the virtualization system of claim 13, *Kjos et al* further teach wherein when said guest operating system is programmed for an x86 processor, the associated monitor prevents execution by said guest operating system of sensitive operating system instructions that must be resolved using traps (*page 6 paragraphs 0056-0057 and 0061—85bit processor for guest OS*)

z. **Claim 60** claims subject matter that is substantially equivalent to the limitations of claim 14 and is therefore rejected under the same basis.

aa. **Per claim 15,** *Kjos et al* in view of *Uchishiba et al* teach the virtualization system of claim 13, *Uchishiba et al* further teach wherein some monitor instances have access to shared memory that is accessible by other monitor instances so as to allow the sharing of information among monitors associated with different partitions (*page 2 paragraphs0035-0036, page 3 paragraph 0040—shared memory*). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of *Kjos et al* and *Uchishiba et al* for the purpose of allowing monitors to have access to the shared memory, because this allows the monitors to share information about the different partitions and allows for easy migration of shared information should any of the monitors or partitions fail.

bb. **Claim 61** claims subject matter that is substantially equivalent to the limitations of claim 15 and is therefore rejected under the same basis.

cc. **Per claim 34,** *Kjos et al* teach the virtualization system of claim 2, yet fail to teach wherein said at least one system partition comprises an ultravisor partition that includes said resource database and said resource management software application, a command partition that owns a resource allocation policy for said host system and creates transactions that pass through a command memory channel between said command partition and said ultravisor partition for processing by said resource management software for reallocation of said system resources as specified in said transaction. However *Uchishiba et al* teach I/O channel that communication from ultravisor partition passes thru for allocation and reallocation of system resources (*page 1 paragraphs 0004-0005, page 2 paragraph 0036, page 4 paragraph 0069-0072*). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of *Kjos et al* and *Uchishiba et al* for the purpose of providing an I/O channel to communicate data between the command and ultravisor partition, because doing so allows for the ultravisor to be input and execute policies and instructions for the resources using the command partition.

dd. **Claim 76** claims subject matter that is substantially equivalent to the limitations of claim 34 and is therefore rejected under the same basis

ee. **Per claim 35,** *Kjos et al* with *Uchishiba et al* teach the virtualization system of claim 34, *Uchishiba et al* further teach wherein said at least one system partition further comprises an operations partition that owns a configuration policy and tracks persistence for

respective domains to which each partition of said at least one host computer is assigned (*page 4 paragraphs 0077-0081, page 5 paragraphs 0093-0095—configuration policy of partitions*)

ff. **Claims 56 and 77** claim subject matter that is substantially equivalent to the limitations of claim 35 and is therefore rejected under the same basis

gg. **Per claim 36,** *Kjos et al* with *Uchishiba et al* teach the virtualization system of claim 35, *Uchishiba et al* further teach wherein the operations partition exchanges resource transactions with said command partition via a secure connection (*page 5 paragraph 0098*).

hh. **Per claim 37,** *Kjos et al* with *Uchishiba et al* teach the virtualization system of claim 35, *Uchishiba et al* further teach wherein the operations partition includes application software that maintains a persistent database of virtual partition definitions for at least one domain of said at least one host computer (*Figures 7-11, page 5 paragraphs 0092-0093 and 0096-0101—partition management table and assignment map of partition with partition definitions and information; Kjos et al—Figures 7 and 20*).

ii. **Claim 78** claims subject matter that is substantially equivalent to the limitations of claim 37 and is therefore rejected under the same basis.

jj. **Per claim 39,** *Kjos et al* with *Uchishiba et al* teach the virtualization system of claim 37, *Uchishiba et al* further teach wherein upon activation of a partition, the operations partition selects a host computer of said at least one host computer having required resources for said activated partition, connects to a resource service running in a command partition of said host computer, and provides a definition of the activated partition and a start command to the resource service (*Figures 7-11, page 5 paragraphs 0092-0093 and 0096-0101—partition*

management table and assignment map of partition with partition definitions and information; Kjos et al—Figures 7 and 20).

kk. **Claim 80** claims subject matter that is substantially equivalent to the limitations of claim 39 and is therefore rejected under the same basis

ll. **Per claim 40,** *Kjos et al* with *Uchishiba et al* teach the virtualization system of claim 39, wherein said command partition stores a copy of said resource database, uses said copy of said resource database to select appropriate resources for the activated partition, and creates a transaction to update said resource database via said command memory channel (*Figures 7-11, page 1 paragraphs 0004-0005, page 2 paragraph 0036, page 4 paragraph 0069-007page 5 paragraphs 0092-0093 and 0096-0101—partition management table and assignment map of partition with partition definitions and information for allocation/reallocation of resources via the memory channel*).

mm. **Claim 81** claims subject matter that is substantially equivalent to the limitations of claim 40 and is therefore rejected under the same basis

X. Claims 38, 41-47, 79 and 82-86 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Kjos et al* (US 2004/0064668) in view of *Uchishiba et al* (2002/0016812) and *Kauffman et al* (US 6,199,179).

nn. **Per claim 38,** *Kjos et al* with *Uchishiba et al* teach the virtualization system of claim 37, yet fail to explicitly teach, wherein the command partition stores a copy of the virtual partition definitions for said at least one domain for bootstrap purposes for initial startup and in the event of a partition failure or a hardware failure of a host computer. However *Kauffman et al* teach storing a copy of partition definitions for initializing startup in the event of a partition or

hardware failure (col.*8 lines 29-36, col.9 line 41-col.10 line 46*). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of *Kjos et al* and *Uchishiba et al* with *Kauffman et al* for the purpose of storing partition definitions for rebooting failed partitions so that partition data is not lost or unrecoverable.

oo. **Claim 79** claims subject matter that is substantially equivalent to the limitations of claim 38 and is therefore rejected under the same basis.

pp. **Per claim 41,** *Kjos et al* with *Uchishiba et al* teach the virtualization system of claim 35, wherein said operations partition includes operations service software that monitors operation of said at least one host computer and, upon detection of host computer failure, chooses a new host computer for virtual partitions assigned to a failed host computer. However *Kauffman et al* teach migration of a failed partition to a new host (*col.5 line 31-col.6 line 13*). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of *Kjos et al* and *Uchishiba et al* with *Kauffman et al* for the purpose of moving or migrating failed partitions from a failed host to a new operating host restarting the partition.

qq. **Claim 82** claims subject matter that is substantially equivalent to the limitations of claim 41 and is therefore rejected under the same basis.

rr. **Per claim 42,** *Kjos et al* with *Uchishiba et al* teach the virtualization system of claim 37, wherein said operations partition assigns an interconnected set of system resources of said at least one host computer to a zone and respective partitions are assigned to the zones with the system resources required by the respective partitions, where a zone is unit of resource allocation for system resources of said at least one host computer within a computer network.

However *Kauffman et al* teach assigning host partitions to respective regions and area with allocated resources for each respective region (*col.9 lines 8-39, col.18 line 45-col.19 line 57*). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of *Kjos et al* and *Uchishiba et al* with *Kauffman et al* for the purpose of separating the partitions into communities or regions in order to allow the partitions in the communities/regions to share allocated resources among the partitions in a community/region.

ss. **Claim 83** claims subject matter that is substantially equivalent to the limitations of claim 42 and is therefore rejected under the same basis.

tt. **Per claim 43,** *Kjos et al* and *Uchishiba et al* with *Kauffman et al* teach the virtualization system of claim 42, *Kauffman et al* further teach wherein said operations partition; assigns new partitions to a host computer that does not include said operations partition by sending, over a network connection, a resource transaction to a command partition of the host computer that does not include said operations partition (*col.11 line 51-col.12 line 5, col.13 lines 13-46—assigning new partitions*).

uu. **Claim 84** claims subject matter that is substantially equivalent to the limitations of claim 43 and is therefore rejected under the same basis.

vv. **Per claim 44,** *Kjos et al* and *Uchishiba et al* with *Kauffman et al* teach the virtualization system of claim 43, *Kauffman et al* further teach wherein said operations partition enables migration of an active partition on a first host computer to a second host computer by transferring memory contents of the active partition from the first host computer to a target partition activated in the second host computer via said network connection (col.*20 lines 27-47—migration of an active partition to another host*)

ww. **Claim 85** claims subject matter that is substantially equivalent to the limitations of claim 44 and is therefore rejected under the same basis

xx. **Per claim 45,** *Kjos et al* with *Uchishiba et al* teach the virtualization system of claim 35, yet fail to further teach wherein said configuration policy targets allocation of system resources to a zone based on at least one of quality of service guarantees, bandwidth guarantees, and physical location of respective host computers. However *Kauffman et al* teach providing a configuration policy for resources in a separate community/region based on the host (*col.20 lines 27-47*) It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of *Kjos et al* and *Uchishiba et al* with *Kauffman et al* for the purpose of separating the partitions into communities or regions in order to allow the partitions in the communities/regions to share allocated resources among the partitions in a community/region.

yy. **Per claim 46,** *Kjos et al* with *Uchishiba et al* teach the virtualization system of claim 35, yet fail to further teach wherein said configuration policy is changeable by a user to permit changes in configuration of said system resources based on different system resource schedules at different times. However *Kauffman et al* teach a user changing a configuration policy of the system resources (*col.23 line 27-col.24 line 11, col.30 lines 5-51, col.33 line 60-col.34 line 12*). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of *Kjos et al* and *Uchishiba et al* with *Kauffman et al* for the allowing users to change the configuration policy in order to allow for customization of the allocated resources based on the user's preference.

zz. **Claim 86** claims subject matter that is substantially equivalent to the limitations of claim 46 and is therefore rejected under the same basis.

aaa. **Per claim 47,** *Kjos et al* with *Uchishiba et al* teach the virtualization system of claim 35, yet fail to explicitly teach wherein said at least one system partition further comprises a redundant operations partition in a second host computer different from the host computer hosting said operations partition. However *Kauffman et al* disclose redundant partition of the host (*col.10 lines 1-10*). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of *Kjos et al* and *Uchishiba et al* with *Kauffman et al* for provisioning a redundant partition that stores and mirrors partition data in order to function as a backup partition in case of partition failure.

XI. Claims 4, 16-21, 51 and 62-67 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Kjos et al* (US 2004/0064668) in view of *Arndt et al* (US 7,555,002),

bbb. **Per claim 4,** *Kjos et al* teach the virtualization system of claim 3, yet fail to explicitly teach wherein said resource management software allocates shared memory to respective partitions as memory channels through which said transactions may pass from one partition to another. However *Arndt et al* teach allocating shared memory using memory channels to communicate partition data between partitions in the system (*col.2 lines 1-14, col.5 lines 22-42*). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of *Kjos et al* and *Uchishiba et al* with *Arndt et al* for using memory channels to pass transactions between the partitions because this allows for exclusive channels that efficiently communicated the shared memory from one partition to another without access or interruption from external entities.

ccc. **Claim 51** claims subject matter that is substantially equivalent to the limitations of claim 4 and is therefore rejected under the same basis.

ddd. **Per claim 16,** *Kjos et al* teach the virtualization system of claim 2, yet fail to teach wherein said system resources include memory channels that enable the communication of transactions among respective guest and system partitions of said host computer, said memory channels comprising shared memory allocated to respective partitions. However *Arndt et al* teach using memory channels as conduits for communicating from one partition to another (*col.2 lines 1-14, col.5 lines 22-42*). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of *Kjos et al* and *Uchishiba et al* with *Arndt et al* for using memory channels to pass transactions between the partitions because this allows for exclusive channels that efficiently communicated the shared memory from one partition to another without access or interruption from external entities.

eee. **Claim 62** claims subject matter that is substantially equivalent to the limitations of claim 16 and is therefore rejected under the same basis.

fff. **Per claim 17,** *Kjos et al* and *Uchishiba et al* with *Arndt et al* teach the virtualization system of claim 16, wherein said at least one system partition includes at least one input/output (I/O) partition that maps physical I/O hardware of said host computer to endpoints of an I/O channel server in said I/O partition, said I/O channel server sharing the physical I/O hardware with at least one guest partition or another system partition via a memory channel between said I/O partition and said at least one guest partition or system partition, said resource management software allocating shared memory to said at least one guest partition or system partition and to said I/O partition to form said memory channel (*Kjos et al: Figures 16-17B, page*

7 paragraph 0067—memory mapped I/O spaces from host to guest partition; Arndt et al—Figure 2, 9 and 10, col.3 lines 9-42, col.4 lines 40-67, col.5 lines 1-56).

ggg. **Claim 63** claims subject matter that is substantially equivalent to the limitations of claim 17 and is therefore rejected under the same basis

hhh. **Per claim 18,** *Kjos et al* and *Uchishiba et al* with *Arndt et al* teach the virtualization system of claim 17, *Kjos et al* further teach wherein upon receipt of a request to said I/O channel server from said at least one guest partition or system partition to access physical I/O hardware said I/O partition checks with partition descriptors stored in a monitor associated with said at least one guest partition or system partition to verify that the requested physical I/O hardware access is valid (*Figures 16-17B, page 7 paragraph 0067—memory mapped I/O spaces from host to guest partition with partition data used by the monitor to verify and assign and access hardware resources*).

iii. **Claim 64** claims subject matter that is substantially equivalent to the limitations of claim 18 and is therefore rejected under the same basis.

jjj. **Per claim 19,** *Kjos et al* and *Uchishiba et al* with *Arndt et al* teach the virtualization system of claim 17, *Kjos et al* further teach wherein said mapping by said at least one I/O partition of said physical I/O hardware of said host computer to endpoints of said I/O channel server in said I/O partition is performed by I/O partition software that multiplexes through shared common I/O physical hardware any I/O requests to said common I/O physical hardware from multiple partitions connected to said I/O partition by respective memory channels (*Figures 16-17B, page 7 paragraph 0067—memory mapped I/O spaces from host to guest partition*)

kkk. **Claim 65** claims subject matter that is substantially equivalent to the limitations of claim 19 and is therefore rejected under the same basis.

lll. **Per claim 20,** *Kjos et al* and *Uchishiba et al* with *Arndt et al* teach the virtualization system of claim 19, *Kjos et al* further teach wherein an I/O monitor associated with said I/O partition implements a system call interface between said I/O monitor and said I/O partition, said system call interface converting and validating client partition relative addresses, obtained as buffer parameters of requests sent through respective memory channels from client memory channel drivers, as valid hardware physical addresses of memory currently assigned to the client partition requesting access to said common I/O physical hardware. (*Figures 16-17B, page 7 paragraph 0067—memory mapped I/O spaces from host to guest partition; Arndt et al: Figure 2, 9 and 10, col.3 lines 9-42, col.4 lines 40-67, col.5 lines 1-56*).

mmm. **Claim 66** claims subject matter that is substantially equivalent to the limitations of claim 20 and is therefore rejected under the same basis.

nnn. **Per claim 21,** *Kjos et al* and *Uchishiba et al* with *Arndt et al* teach the virtualization system of claim 20, *Kjos et al* further teach wherein messages between a server of said I/O partition and said respective client partitions are queued by the client partitions and de-queued by the I/O partition server and the partition relative physical addresses are converted by the I/O partition server to physical I/O hardware addresses with the aid of the I/O monitor, whereby data may be exchanged with hardware I/O adapters connected between said I/O monitor and said common I/O physical hardware (*Figures 16-17B, page 7 paragraph 0067—memory mapped I/O spaces from host to guest partition with physical addresses, queued and de-queued*

by client/guest partitions; Arndt et al: Figure 2, 9 and 10, col.3 lines 9-42, col.4 lines 40-67, col.5 lines 1-56, col.2 lines 1-14, col.5 lines 22-42.)

ooo. **Claim 67** claims subject matter that is substantially equivalent to the limitations of claim 21 and is therefore rejected under the same basis.

XII. Claims 5-9, 22-24, 52-55 and 68-69 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Kjos et al* (US 2004/0064668) in view of *Arndt et al* (US 7,555,002) and *Kauffman et al* (US 6,199,179).

ppp. **Per claim 5,** *Kjos et al* and *Arndt et al* teach the virtualization system of claim 4, yet fail to explicitly teach wherein a system partition that experiences a processing failure is recovered by rebooting said failed system partition, reassigning system resources preserved for the failed system partition to the rebooted system partition and rolling back any pending transactions in progress by said failed partition to reinstate a status of the resource database entries to a status prior to the time of failure of said system partition. However *Kauffman et al* teach reassigning and migrating resources from a failed partition to a rebooted system and restored back to the last migration instruction (*col.31 lines 3-37, col.34 lines 38-56, col.35 line 34-col.36 line 38*). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of *Kjos et al* and *Arndt et al* and *Kauffman et al* for the purpose of rebooting a failed partition to rolling back the pending transaction that were in process during the failure for implementing a partition recovery without compromising or corrupting the partition data.

qqq. **Claim 52** claims subject matter that is substantially equivalent to the limitations of claim 5 and is therefore rejected under the same basis.

rrr. **Per claim 6,** *Kjos et al* and *Arndt et al* with *Kauffman et al* teach the virtualization system of claim 5, *Kauffman et al* further teach wherein said at least one system partition comprises an ultravisor partition that includes said resource database and said resource management software application and a command partition that includes resource allocation software that owns a resource allocation policy for said host system and creates transactions that pass through a command memory channel between said command partition and said ultravisor partition for processing by said resource management software for reallocation of said system resources as specified in said transaction (*col.2 lines 28-46—implementing a hypervisor partition for issuing allocation commands*)

sss. **Claim 53** claims subject matter that is substantially equivalent to the limitations of claim 6 and is therefore rejected under the same basis.

ttt. **Per claim 7,** *Kjos et al* and *Arndt et al* with *Kauffman et al* teach the virtualization system of claim 6, *Kauffman et al* further teach wherein said resource management software maintains an audit log of processed transactions to enable said rolling back of transactions involving said failed system partition and enables reapplication of transactions from said audit log (*col.10 lines 1-25 and 47-60*).

uuu. **Claim 54** claims subject matter that is substantially equivalent to the limitations of claim 7 and is therefore rejected under the same basis.

vvv. **Per claim 8,** *Kjos et al* and *Arndt et al* with *Kauffman et al* teach the virtualization system of claim 6, *Kauffman et al* further teach wherein said system partitions include a boot partition that contains hardware partition boot firmware for recovery operations when necessary to boot and reboot an other system partition and initiates transactions to said

resource management software application requesting resources for said other system partition until the command partition may create transactions for allocating resources to the other system partition (*col.31 lines 3-37, col.34 lines 38-56, col.35 line 34-col.36 line 38—initialization/booting for recovery partition operations and transactions*).

www. **Claim 55** claims subject matter that is substantially equivalent to the limitations of claim 8 and is therefore rejected under the same basis

xxx. **Per claim 9,** *Kjos et al* and *Arndt et al* with *Kauffman et al* teach the virtualization system of claim 6, *Kauffman et al* further teach wherein said command partition include resource allocation software generates said transactions based on said resource allocation policy (*col.9 line 8-col.10 line 25*).

yyy. **Per claim 22,** *Kjos et al* with *Arndt et al* teach the virtualization system of claim 17, wherein said mapping by said at least one I/O partition of said physical I/O hardware of said host computer to endpoints of said I/O channel server in said I/O partition is performed by passing I/O setup information via said memory channel to said I/O channel server so as to set up a high performance memory channel between a client partition requesting I/O access and intelligent physical I/O hardware and sending data directly between said client partition requesting I/O access and said intelligent physical I/O hardware via said high performance memory channel (*Arndt et al—col.3 line 25-col.4 line 67; Kauffman et al—col.7 lines 34-65, col.8 lines 13-43, col.12 lines 21-54, col.13 lines 13-26*).

zzz. **Claim 68** claims subject matter that is substantially equivalent to the limitations of claim 22 and is therefore rejected under the same basis.

aaaa. **Per claim 23,** *Kjos et al* with *Arndt et al* teach the virtualization system of claim 22, wherein the client partition requesting I/O access transfers data via said I/O memory channel to said intelligent physical I/O hardware using one of a user mode I/O or direct memory access data transfer operation (*Arndt et al—col.5 lines 6-56, col.11 lines 47-57; Kauffman et al—col.7 lines 34-65, col.8 lines 13-43, col.12 lines 21-54, col.13 lines 13-26*).

bbbb. **Claim 69** claims subject matter that is substantially equivalent to the limitations of claim 23 and is therefore rejected under the same basis.

cccc. **Per claim 24,** *Kjos et al* with *Arndt et al* teach the virtualization system of claim 17, yet fail to explicitly teach wherein the at least one I/O partition includes two redundant I/O partitions. However *Kauffman et al* teach the provision of redundant I/O partitions (*col.10 lines 1-10).* It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of *Kjos et al* and *Arndt et al* with *Kauffman et al* for provisioning a redundant partition that stores and mirrors partition data in order to function as a backup partition in case of partition failure.

Allowable Subject Matter - Objection

XIII. **Claims 31-32 and 73-74** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 31 and 73 (differ merely by statutory class) cites "the virtualization system of claim 30, wherein said resource management software application allocates memory to said respective system

and guest partitions by storing a partition descriptor for a desired partition number [G,M,K] in said memory as Mem(G,M,K)=((G*2.sup.10+M)*2.sup.10+K)*2.sup.10*(word size), where word size is a power of 2". The cited prior art fails to teach this limitation.

Claims 32 and 74 (differ merely by statutory class) cites "the virtualization system of claim 31, wherein the stored partition descriptor is provided to the monitor associated with the partition defined by the partition descriptor whereby said monitor may constrain applications in its partition to the memory defined by said partition descriptor". The cited prior art fails to teach this limitation.

In light of the above indications of allowable subject matter, the base independent Claim 1 and 48 would be allowable over the prior art if the limitations from Claim 31 and 73 and their intervening claims were incorporated into its claim language, or the base limitations of Claim 32 and 74 and its intervening claims.

Conclusion

XIV. The prior art made of record and not relied upon is considered pertinent to Applicant's disclosure: Chaudhry et al (7673103), Ogasawara et al (7305670), Craddock et al (7095750), Waldspurger et al (6725289), Hansen et al (6006318), Nota et al (5805790), Osisek (5555385).

XV. Any inquiry concerning this communication or earlier communications from the examiner should be directed to KRISTIE D. SHINGLES whose telephone number is (571)272-3888. The examiner can normally be reached on Monday 9:00am-6:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William Vaughn can be reached on 571-272-3922. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Kristie D. Shingles/
Examiner, Art Unit 2444